mented upon himself and inoculated his arm each time with some of the same lymph he used for the mice and guinea-pigs respectively, but in no case did any reaction worthy of record follow.

In order to determine more particularly the qualitative bacterial character of these various samples of calf-lymph, plate-cultures were also made and pure cultures obtained of different bacteria, which were subsequently inoculated both into mice and into his own arm. In two cases coccus forms proved fatal to mice, whilst in the other inoculations no symptoms of importance followed. As regards the inoculations practised upon himself with these pure cultures, nothing more significant than a slight abscess resulted, except on one occasion when an affection of the adjoining lymphatic glands was experienced.

In commenting upon these results, Dr. Dreyer states that it should be borne in mind in connection with those instances where fatal results followed the introduction of the lymph into mice, that, in the first place, the mode of inoculation obliged to be adopted was not really comparable to the simple incision made in the case of human vaccination, and that, secondly, the quantity of lymph employed relative to the size of the animal was far greater than is the case in ordinary inoculations. Moreover, the two pathogenic results which followed the inoculation of a pure culture of a coccus form do not constitute any justifiable plea for the abolition of calf-lymph vaccination. It must be remembered that the conditions of such pathogenic infection are very different from those which may be present in ordinary inoculations, should pathogenic bacteria originally be present in the lymph, for, in employing a pure cultivation of a particular micro-organism, the latter is introduced into the system in immeasurably larger numbers than would be the case were it introduced direct with the lymph.

We would, in conclusion, recommend the closing paragraph of Dr. Dreyer's memoir to the consideration of that noisy section of unreasoning obstructionists who may, even in his experiments, endeavour to find some support for their crusade against the vaccination laws : "I consider, therefore, that I may conclude from my investigations that the latter afford no support which justifies the fear that animal lymph as at present prepared can produce any serious injury to those inoculated with it."

G. C. FRANKLAND.

UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

OXFORD.—The Junior Scientific Club held its 188th meeting at the Museum on May 4. After the Treasurer's balance-sheets had been read and carried, Mr. A. E. Tutton discoursed on the Glaciers of the Pennine Alps, illustrating his remarks by numerous lantern slides. Mr. H. E. Stapleton (St. John's) read a paper on turpentine extraction in the Southern States.—The Officers for this term are: President, Mr. W. E. Moss (Trinity). Chem. Sec., Mr. F. Soddy (Merton). Biolog. Sec., Mr. E. Gurney (New Coll.). Editor, Mr. H. E. Stapleton (St. John's). Treasurer, Mr. W. E. Blackall (Non. Coll.). Committee, Mr. W. B. Billinghurst (St. John's), Mr. C. E. A. Wilson (Ch. Ch.), Mr. F. P. Nunneley (B. N. C.), The conversazione will be held on May 24—Tuesday in Eights' Week—at 8 p.m.

CAMBRIDGE.—A University lectureship in applied mathematics will be vacant at the end of the academical year by the resignation of Mr. R. T. Glazebrook, F.R.S. Applications are to be sent to the Vice-Chancellor by May 17.

The Smith's prizes are awarded (1) to Mr. E. W. Barnes, Trinity, and (2) to Mr. W. A. Houston, St. John's.

Dr. Kanthack proposes to hold, during the Long Vacation, courses of instruction in general pathology, morbid anatomy and histology, bacteriology, and clinical pathology. The courses begin on July 8.

The University tables at Naples and Plymouth are about to be vacant. Applications for facilities for zoological research are to be sent to Prof. Newton by June 1.

Twenty-four candidates have passed the half-yearly examination in sanitary science just completed, and have received the University diploma in public health.

Twenty-eight additional freshmen, including one advanced student, were matriculated on May 5.

The University grant of 100*l*. a year for three years, made to the British School of Archæology at Athens in 1895, is to be renewed for another period of three years.

The Frank Smart studentship in botany, of the annual value of 100*l*. for two or three years, will be vacant on June 20. Candidates must be B.A.s who have taken honours in the Natural Sciences Tripos. Application is to be made to the Master of Caius College by June 11.

A combined examination for entrance scholarships and exhibitions in natural science will be held by Pembroke, Caius, King's, Jesus, Christ's, St. John's, and Emmanuel Colleges next term, beginning on November 1. A large number of major and minor scholarships and exhibitions, varying in annual value from 80*l*. to 30*l*., will be offered. The subjects include chemistry, physics, elementary biology, physical geography, animal physiology, zoology, and botany; and candidates may offer from two to four of these. In all branches the candidates' practical work will be tested. Full particulars may be obtained from the Tutors of the respective colleges.

THE Duke of Devonshire stated in the House of Lords on Monday that, as soon as the Committee stage of the Irish Local Government Bill was disposed of, the London University Commission Bill would have a prominent place among those measures which the Government intended to pass during the remainder of the Session.

DURING the past fifteen months, says the Paris correspondent of the *Chemist and Druggist*, the sums subscribed by manufacturers and bankers in the district of Nancy for promoting the study of chemistry and physics, as applied to industry, in connection with the University of that town, have reached 400,000f. (16,000*l*.). The Lyons University has been authorised to contract a loan of 626,500f. (25,000*l*.), to be applied (1) to completing the Chemical Institute, (2) extending the laboratories of experimental and comparative medicine and physiology, (3) completing the laboratory of maritime physiology at Tamaris, Var.

THE following items concerning endowments of higher scientific education in the United States are recorded in *Science*:—The West Virginia University has established eleven fellowships yielding 300 dollars yearly and free tuition. The fellows are expected to teach one hour a week or give two hours' supervision in the laboratory. Among the eleven subjects for which the fellowships have been awarded are chemistry, physics, geology, zoology, botany, mathematics, mechanical engineering and civil engineering.—The estate of Mrs. Julia W. James, of Boston, divided by her will between the Museum of Fine Arts and the Massachusetts Institute of Technology, amounts to over 500,000 dollars.—The John Tyndall Fellowship of Columbia University for the encouragement of research in physics has been awarded to R. B. Owen, a graduate of the School of Engineering and professor of engineering in the University of Nebraska. Among the twenty-four fellowships annually awarded are the following: T. E. Hazen, botany; B. H. Owen, philosophy; J. D. Irving, geology; E. Kasner, mathematics; W. C. Kretz, astronomy; J. W. Miller, jun., mechanics; F. C. Paulmier, zoology; F. J. Pope, chemistry; C. E. Prevey, statistics; R. S. Woodworth, psychology.

SOCIETIES AND ACADEMIES.

LONDON.

Geological Society, April 20.—W. Whitaker, F.R.S., President, in the chair.—Note on an ebbing and flowing well at Newton Nottage (Glamorganshire), by H. G. Madan. This well lies in a direct line drawn north and south from the church of Newton Nottage to the sea, about 80 yards south of the church and 500 yards from the sea. Sand-hills about 20 or 30 feet high lie between it and the sea. A range of carboniferous limestone cliffs runs east and west to the north of the church, while the same formation crops out in the sea at half-tide level. Between the two there is a band of Keuper conglomerate covered in one place at least by 7 feet of brown loamy clay with pebbles. At the shore-junction of conglomerate and limestone numerous springs occur, and it is in the conglomerate that the well is sunk, its bottom being 8 feet above Ordnance datum. A series of about forty observations made at intervals of an hour (and in many cases at the intermediate half-hours), during three consecutive days, enabled the author to construct curve showing the relationship existing between the rise and fall of the tide on the coast and that of the water in the well. The result is to establish the existence of a wave in the well of the same frequency as the tidal wave, but delayed, or with an establishment of, three hours (*plus* or *minus* a few minutes). The analyses of water taken from the well at its highest and lowest show no difference, so that no sea-water enters the well directly. On the other hand, the slight brackishness of the water appears to prove the diffusion of a small amount of salt water into the well.—*Petalocrinus*, by F. A. Bather. Certain curious fan-like objects, obviously echinodermal, have for a long time been preserved in the Riks-Museum at Stockholm, but their significance was first definitely ascertained when similar fossils were found in Iowa, and brought to England by Mrs. Davidson. The latter were described by Mr. Stuart Weller in a paper entitled "*Petalocrinus mirabilis* (n. sp.), and a New American Fauna"; and the former, with fresh material obtained by Mr. Weller from various American localities, are the subject of the present communication. The Silurian crinoid genus *Petalocrinus*, Weller, is discussed, on the evidence of all the original material from Iowa and of the further material above mentioned.—On the origin of the auriferous conglomerates of the Gold Coast Colony (West Africa), by Thomas B. F. Sam.—This paper gives an account of a recent journey from Adjah Bippo to the Ankobra Junction in the Gold Coast Colony. A range of clay-slate hills is succeeded for 6 miles by flat ground in which diorite was found, and that by a lofty hill in which clay-slate dipping east occurs. The Teberibie range with reefs of conglomerate, and a second range with similar reefs were crossed. Gold-bearing alluvia are briefly described, and the gold is supposed to have come from the hills. The Adjah Bippo, Takwa, and Teberibie formations are considered to be part of a syncline. Some conclusions are drawn as to the method of formation and probable auriferous character of the rocks.

Linnean Society, April 21.—Dr. A. Günther, F.R.S., President, in the chair.—On behalf of Lieut.-Colonel Birch-Reynardson there was exhibited a portion of the trunk of an apple-tree which had been so seriously attacked by water voles (*Arvicola amphibius*) as to cause the death of the tree; and several others, it was stated, had been similarly injured. Such extensive damage from such a cause was regarded as unusual.—Mr. G. E. Barrett Hamilton exhibited a head of the common brown rat (*Mus decumanus*), showing a curious deformity arising from injury to the incisor teeth.—Prof. Douglas Campbell communicated a paper, which was demonstrated by Mr. A. Gepp, on the structure of *Dendroceros*. The chief conclusions arrived at were as follows: (1) In its apical growth and the form of the thallus, *Dendroceros* differs decidedly from other genera of the order Hepaticæ. (2) The archegonium corresponds in its structure to that of the other Anthocerotaceæ, and is intermediate in character between *Notothylus* and *Anthoceros*. (3) The antheridium is solitary, and arises, as in the others of the order, endogenously. (4) The first wall in the embryo is longitudinal, as in *Anthoceros*, but the first transverse wall determines the limits of the foot, as in *Notothylas*. (5) The origin of the archesporium is from the amphithecium as in the other genera, but it is less massive than in either of these. (6) The division of the archesporial cells into sporogenous and sterile ones is less regular than in either of the other genera, and the primary archesporial cells may be transformed directly into sporogenous ones without any further divisions. (7) In *D. Breutelii* the spores remain undivided, but in *D. crispus* (?) they germinate within the capsule and are discharged as multicellular bodies. (8) Leitgeb's statement as to the absence of stomata from the capsule was confirmed.—Mr. W. P. Pycraft read a paper on the morphology of the owls (Part 1, Pterylography). In this, the first instalment of a series of papers in which it is proposed to deal with the affinities and phylogeny of the group, the pterylographic characters were alone considered, descriptions of adults, nestlings, and embryos being given. The author remarked that, so far as the distribution of the feather-tracts is concerned, the owls resemble the *Accipitres* more nearly than any other group. The form of the external aperture of the ear seems to have been originally subject to variations, the most successful of which have become fixed by selection. In some cases there is a marked asymmetry, which may either be confined to the membranes surrounding the aperture, or may extend to the skull itself. The author considered that the facts disclosed by a study of the pterylosis might justify a slight revision and rearrangement of some of the genera.—A paper was read by Mr. J. Johnstone upon the thymus and thyroid glands in the Marsupialia. The author had investigated the neck-glands in adults of nine and pouch-specimens of seven genera, representative of the leading Marsupial families. The thymus was observed to be absent only in the Koala (*Phascolarctus*), and to persist predominantly in the region of the carotid roots.

MANCHESTER.

Literary and Philosophical Society, April 19.—Mr. J. Cosmo Melvill, President, in the chair.—The following were elected officers and members of the Council for the ensuing year:—President, J. Cosmo Melvill; Vice-Presidents, Prof. O. Reynolds, F.R.S., Prof. A. Schuster, F.R.S., Charles Bailey, and W. H. Johnson; Secretaries, R. F. Gwyther and Francis Jones; Treasurer, J. J. Ashworth; Librarian, W. E. Hoyle; other members of the Council, Prof. H. B. Dixon, F.R.S., Prof. H. Lamb, F.R.S., F. Nicholson, J. E. King, R. L. Taylor, and F. J. Faraday.—Mr. Charles Bailey exhibited some living plants of Jacquin's oxlip (*Primula elatior*), which he had gathered ten days ago in a wood at Tindon End, near Thaxted, Essex. He pointed out its peculiar distribution in England—where it is confined to an area within the triangle formed between St. Neots in Huntingdonshire, Stowmarket in Suffolk, and Bishop Stortford in Hertfordshire—and explained the botanical characters which separate it from the primrose and the cowslip. With it Mr. Bailey exhibited a flower-scape from a root which he brought some years ago from Gloddaeth, near Llandudno, which was a natural hybrid between the cowslip and the primrose, and which flowered every spring in his garden. Such hybrids generally pass for the true oxlip, and they are not infrequent in districts where both parents occur; in the neighbourhood of Manchester he had found this spurious oxlip at Ashley, at Mobberley, and in several places in Derbyshire.

EDINBURGH.

Royal Society, April 4.—Prof. Copeland, in the chair.—At the request of the Council, an address on theories concerning the structure and origin of coral reefs and islands was given by Dr. John Murray. After a brief sketch of the history of the subject, and an exposition of the insufficiency of Darwin's famous theory as an explanation of the origin of many coral reefs and islands, Dr. Murray, with the help of lantern slides, gave an account of the theory he himself supported, which was to a large extent a return to the views of Chamisso (1820). The results of recent investigations, such as Mr. Andrews' labours at Christmas Island, the extensive observations by Alexander Agassiz in the Fiji group, the boring in the island of Funafuti, and the work of the Admiralty Surveyors in the Pacific Ocean, were then referred to; and, in spite of statements to the contrary which had been going the round of newspapers, Dr. Murray concluded that all these recent discoveries tended to verify his hypothesis rather than that of Darwin.

May 2.—Dr. Munro, in the chair.—In a paper on consonant sounds, Dr. Lloyd discussed in detail the simplest group of consonantal sounds, known as the spirate fricatives, namely, *f*, *v*, *th* (both forms), *s*, *z*, *sh*, *zh*, the Scottish gutturals *ich*, *och*, and the aspirate *h*. These are all produced by the friction of the air escaping through interstices more or less narrow. They could all be whispered through a range of pitch peculiar to each, the pitch depending upon the length and shape of the resonating cavity, which at the same time determined the vowel sound associated with the consonant.—Prof. D'Arcy Thompson communicated an examination of the so-called bipolar hypothesis. Of the list of ninety forms deduced by Dr. Murray from the *Challenger* Reports in support of this hypothesis, about half were insufficiently authenticated, and a great number more were very minute and described wholly from their hard parts; of the remainder some were not really arctic or antarctic forms, and the few that seemed to present "bipolar" characteristics were remarkable in other respects. Moreover, there were no examples cited from well-marked groups, such as fishes and Crustacea. In the discussion which followed, Dr. Murray argued that the fact of bipolarity had long been recognised, Prof. D'Arcy Thompson maintaining that the data supplied by Dr. Murray were insufficient to establish its existence.—Mr. A. J. Herbertson exhibited maps showing the mean monthly and annual rainfall over the land surface of the globe. This was the first attempt to construct mean monthly rainfall charts for the whole globe. All available data had been used, and many interesting results had been obtained.

DUBLIN.

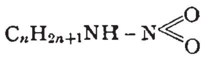
Royal Dublin Society, April 20.—Prof. W. Noel Hartley, F.R.S., in the chair.—Prof. Emerson Reynolds, F.R.S., gave a demonstration of the properties of some new silicon derivatives discovered in the chemical laboratory of Trinity College, Dublin, and showed their use in photography.—Dr. E. J. McWeeney demonstrated a special method of performing the sero-diagnostic test for typhoid fever. It consisted in causing Eberth's bacillus to grow in a hanging drop of neutral bouillon containing 10 per cent. of the serum under investigation. After a few hours at 37° C. the individuals originally present (which should be very few—one only if possible), would be found to have multiplied in such a way as to form chains of short elements devoid of motility. In twelve hours these chains had become very long and beautifully curved and contorted, occupying the whole area of the drop. This chain formation only occurred with typhoid serum. With non-typhoid serum the drop soon became filled up with actively motile separate individuals. Filament-formation he did not look upon as significant. Similar appearances had been noted by Charrin and Roger for *Pyocyaneus*, by Pfaundler for *Coli*, and by Ledoux-Lebard for pseudo-tuberculosis. Photographs of desiccated and stained hanging-drop cultures were thrown on the screen.—Dr. J. H. Clark contributed a paper on protoplasmic movements: their relation to oxygen pressure. The paper gave a detailed statement of the author's investigations on the subject, of which an abstract appeared in the *Proceedings* of the Royal Society.—Dr. T. Johnson and Miss Hensman presented a paper consisting of a list of Irish Corallinaceæ, with the distribution of the Irish species, and many additions to the list of recorded species.

PARIS.

Academy of Sciences, May 2.—M. Wolf in the chair.—On the legitimacy of the trapezium rule in the study of the resistances of dams built of masonry, by M. Maurice Lévy. A critical examination of the "trapezium" law, according to which the normal pressures exerted upon each arch are connected by a linear relation.—Researches on the state in which silicon and chromium occur in steels, by MM. A. Carnot and Goutal. From a sample of ferrosilicon, by the prolonged action of dilute sulphuric acid, the silicide $SiFe_2$ was isolated, which differs from the substance of the same composition obtained by M. Moissan in being easily attacked by warm dilute acids. From alloys containing manganese, a double silicide of manganese and iron is obtained. Starting from chrome steels, similar methods gave $Fe_3Cr_9C_7$ or $CFe_3.3C_2Cr_3$ and $Fe_9Cr_3C_5$.—Remarks on some Crustacea obtained from the six scientific voyages of the Prince of Monaco, by MM. Milne-Edwards and E. L. Bouvier. Amongst the decapod Crustaceæ only one new form was found, *Sympagurus Grimaldii.*—On ortho-benzyl-benzoic and dimethylamido-diethylamido-ortho-benzoyl-benzoic acids and some of their derivatives, by MM. A. Haller and Guyot.—On the autoplastic grafts obtained by the transplantation of large dermic strips. Their stability and the slow modifications which they undergo, by M. Ollier. The transplanted skin undergoes a progressive atrophy, losing always its original dimensions.—The return of the first periodic Tempel Comet (1867 II.) in 1898, by M. R. Gautier. A revision of the elements of this comet, rendered necessary by the varying perturbations caused by the planet Jupiter.—Relations of commensurability between the mean movements of the satellites of Saturn, by M. Jean Mascart.—Reply to a reclamation of priority of M. Marqfoy, by M. Daniel Berthelot.—On the radiations emitted by thorium and its compounds, by M. G. C. Schmidt. Thorium salts emit rays similar to those discovered by M. Becquerel for uranium salts. Quantitative comparisons of the times required to discharge an electrified plate by the rays from thorium and uranium salts showed that the latter act more powerfully. The sign of the charge in either case is without effect upon the results.—On the cycles of magnetic torsion of a steel wire, by M. G. Moreau.—A receiver for Hertzian telegraphy without wires, by M. E. Ducretet. An improvement upon a similar instrument devised by M. Popoff. A Branly tube, which undergoes sudden changes of resistance under the influence of the Hertzian waves, forms part of a delicate relay system. The whole apparatus is automatic, the message being printed in Morse character upon a strip in the usual way, the strip ceasing to unroll when the waves stop.—On the electrical conductivity of potassium permanganate, by M. G. Bredig. Remarks on the paper of M. Legrand in a recent number of the *Comptes rendus*, pointing out the prior measurements of M. Bredig and MM. Franke and Lovén.—The Perpetual Secretary remarked that the conductivity of some solutions of potassium permanganate was measured by M. Bouty as early as 1884.—Effects of solar and lunar attractions upon the atmosphere. Example of the application of formulæ, by M. A. Poincare.—On the iodide of beryllium, by M. P. Lebeau. By the action of dry hydriodic acid gas upon beryllium carbide at 700°, the pure iodide BeI_2 is readily obtained as a crystalline sublimate. It forms colourless crystals, readily attacked by moist air, boiling between 585° and 595° C. It reacts violently with water, and with many organic substances, and from it new compounds of beryllium with sulphur, phosphorus, and cyanogen can be obtained.—On the presence of the chlorides of potassium and sodium in large proportions in the juice of grapes, and in the wines of the salt regions of Oranie, by M. Edmond Bonjean — New reaction of tertiary alcohols and their ethers, by M. G. Denigès. The reaction employed is an acid solution of mercuric sulphate; characteristic yellow mercury compounds are formed.—Action of alkalis upon ouabaine, by M. Arnaud. An acid is formed, termed ouabaic acid, the sodium, strontium, and barium salts of which are described.—Action of bromine upon some phenols in presence of aluminium bromide, by M. F. Bodroux.—On the mono-alkyl-phosphoric ethers, by M. J. Cavalier.—Influence of diffused daylight upon the development of plants, by M. J. Wiesner.—On chocolate-coloured oats, by M. Balland. No differences in the results of analysis could be found between the brown grains and the ordinary white ones.—The bitterness of wines, by MM. F. Bordas, Joulin, and de Raczkowski. A description of the habit and mode of growth of the bacillus causing the bitterness in wine.—Pathogeny and histogenesis of cancer, a parasitic disease, by M. F. J. Bosc. The only specific element in malignant tumours is the parasitic sporozoa described in previous papers.—Softening of bone by phloroglucinol, by M. J. J. Andeer. A solution of phloroglucinol in hydrochloric acid forms a valuable histological reagent for softening bone without changing its relation to other structures.

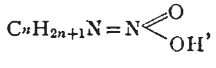
AMSTERDAM.

Royal Academy of Sciences, March 26.—Prof. van de Sande Bakhuyzen in the chair —Prof. Franchimont and Dr. H. Umbgrove on the action of sulphuric acid of 35 to 40 per cent. at the ordinary temperature upon acid aliphatic nitramines, upon neutral ones and upon their isomers. The first mentioned (methyl-, ethyl-, propyl- and butylnitramine) very slowly yielded nitrous oxide and an alcohol, and in addition —excepting methyl nitramine—a small quantity of non-saturated carburetted hydrogen. The same result was obtained with their potassium, barium and silver derivatives. The neutral nitramines were not attacked; their isomers, however, were attacked very rapidly. Experiments were made with the isomers of propylethylnitramine, of methylethylnitramine, of dimethylnitramine, and of ethylmethylnitramine. All of them, except the last, in which again CH_3 is united with nitrogen, yielded a little ethane, besides N_2O and one or two alcohols. The authors think that through the action of sulphuric acid the acid nitramines



$$C_nH_{2n+1}NH-N\begin{matrix}\diagup O\\ \diagdown O\end{matrix}$$

slowly change into



$$C_nH_{2n+1}N=N\begin{matrix}\diagup O\\ \diagdown OH\end{matrix},$$

and that the latter, being diazonitramines, are rapidly decomposed, as well as their alkyl derivatives, the isomers of the neutral nitramines.—Dr. G. C. J. Vosmaer and Prof. C. A. Pekelharing on the reception of food by sponges. When sponges (Spongillæ and Sycones) were fed with carmine, the colouring matter was always found first in the collar cells. Metschnikoff's objection against the view, according to which the food is received into the flagellated chambers, may perhaps have arisen from the circumstance that Metschnikoff allowed the moment favourable for the inquiry to slip by. In the case of Leucosplenia just taken out of the sea water and cut open longitudinally, the movements of the flagellated chambers were found to be most irregular, and without a trace of coordination. The authors think that the regular passage of water through sponges, in consequence of an irregular movement in the flagellated chambers, is to be explained by taking into account (1) the shape of the supplying and discharging apertures, from which it may be concluded that the collar cells counteract, like valves, the discharging of water through the supplying apertures, and (2) the shape of the discharging channels, which may serve as suction channels.—Prof. van Bemmelen made a communication on the absorptive power of colloidal silicic acid.—Prof. H. A. Lorentz on optical phenomena, depending on the electrical charge and the mass of the ions. Part I. Measurements on the Zeeman effect give the value of $\frac{l}{m}$, l being the charge and m the mass of the ions. The author remarks that some other phenomena depend on the quantity $\frac{l^2}{m}$; in particular he discusses the dispersion and the absorption coefficient of gaseous media.—Prof Korteweg presented a communication by Mr. W. A. Wijthoff, entitled "A system of operations in the space of four dimensions analogous with Hamilton's quaternions." The geometrical operations described in it are represented by biquaternions, which prove to be identical with those of Clifford for the elliptical space.

DIARY OF SOCIETIES.

THURSDAY, May 12.

Royal Society, at 4.30.—A Study of the Phyto-Plankton of the Atlantic: G. Murray, F.R.S., and V. H. Blackman.—The Electrical Response of Nerve to a Single Stimulus investigated with the Capillary Electrometer. Preliminary Communication: Prof. Gotch, F.R.S., and G. J. Burch.—Effects of Prolonged Heating on the Magnetic Properties of Iron: S. R. Roget.—On the Connection of Algebraic Functions with Automorphic Functions: E. T. Whittaker.

Royal Institution, at 3.—Heat: Lord Rayleigh.

Mathematical Society, at 8.—On the Numerical value of $\int_0^h e^{x^2} dx$: H. G. Dawson.—On the Reflection and Transmission of Electric Waves by a Metallic Grating: Prof. Lamb, F.R.S.—Notes on some Fundamental Properties of Manifolds: A. E. H. Love, F.R S.

Institution of Electrical Engineers (Society of Arts), at 8.—The Registration of Small Currents used for Electric Lighting and other Purposes: A. H. Gibbings.—A Magnetic Balance for Workshop Test of Permeability: Prof. J. A. Ewing, F.R.S.

FRIDAY, May 13.

Royal Institution, at 9.—Recent Experiments on certain of the Chemical Elements in Relation to Heat: Prof. W. A. Tilden, F.R.S.

Royal Astronomical Society, at 8.—Micrometrical Measures of the Double Stars β 883, Sirius, and Procyon: T. J. J. See.—The Relative Motion of the Components of γ Leonis: S. W. Burnham.—Vanadium in the Spectrum (C to D) of Sun-spots: Rev. A. L. Cortie.—Notes on the Zodiacal Light: Wm. Anderson.

Physical Society, at 5.—Galvanometers, Part II.: Prof. W. E. Ayrton and T. Mather.

Malacological Society, at 8.—Note on a very large Specimen of *Hippopus Hippopus*: Edgar A. Smith.—Description of New, or Imperfectly-known Species of *Nautilus* from the Inferior Oolite, contained in the British Museum (Natural History): G. C. Crick.—On the Anatomy of *Adeorbis subcarinatus* (Montagu): Martin F. Woodward.—Phylogeny of the Genera of Arionidæ: Henry A. Pilsbry.

SATURDAY, May 14.

Geologists' Association (King's Cross, G.N.R.), at 1.20.—Excursion to Ayot and Hatfield. Directors: J. Hopkinson and A. E. Salter.

Essex Field Club, at 7.—Notes on the Trees and Shrubs of Epping Forest: F. W. Elliott.

MONDAY, May 16.

Society of Arts, at 8.—Electric Traction: Prof. Carus Wilson.

Victoria Institute, at 4.30.—The Philosophy of Education: Dr. A. T. Schofield.

TUESDAY, May 17.

Zoological Society, at 8.30.—On a Small Collection of Mammals obtained by Mr. Alfred Sharpe in Nyasaland: Oldfield Thomas.—On a Collection of Lepidoptera made in British East Africa by Mr. C. S Betton: Dr. A. G. Butler.—On some Earthworms from India: Miss Sophie M. Fedarb.

Royal Statistical Society, at 5.—Local Taxation in London: G. Laurence Gomme.

Royal Victoria Hall, at 8.30.—Three Months on a Coral Island: Prof. Sollas, F.R.S.

WEDNESDAY, May 18.

Society of Arts, at 8.—The Evolution of the Cycle: J. K. Starley.

Geological Society, at 8.—The Garnet-actinolite Schists on the Southern Side of the St. Gothard Pass: Prof. T. G. Bonney, F.R.S.—On the Metamorphism of a Series of Grits and Shales in Northern Anglesey: Dr. C. Callaway.—On a Volcanic Series in the Malvern Hills near the Herefordshire Beacon: H. D. Acland.

Royal Meteorological Society (Burlington House), at 4.30.—The Frequency of Rainy Days in the British Islands: Robert H. Scott, F.R S.—The Abnormal Weather of January, 1898: Frederick J. Brodie.

Royal Microscopical Society, at 8.—Exhibition of Aquatic Life.

THURSDAY, May 19.

Royal Institution, at 3.—Heat: Lord Rayleigh.

Chemical Society, at 8.—The Action of Formaldehyde on Amines of the Naphthalene Series: G. T. Morgan.—On the Constitution of Oleic Acid and its Derivatives. Part I.: F. G. Edmed.

SATURDAY, May 21.

Royal Institution, at 3.—Biology of Spring: J. Arthur Thomson.

Geologists' Association (Paddington Station, G.W.R.), at 1.40.—Excursion to Penn and Coleshill. Director: W. P. D. Stebbing.

Essex Field Club (at Chingford), at 7.—On the Preparation of Marine Animals as Transparent Lantern Slides: Dr. H. C. Sorby, F R.S.

BOOKS, PAMPHLETS, and SERIALS RECEIVED.

Books.—The Flora of Perthshire: Dr. F. B. White (Blackwood).—Submarine Telegraphs: C. Bright (Lockwood).—The Origin and Growth of the Moral Instinct: A. Sutherland, 2 Vols. (Longmans).—Birds in London: W. H. Hudson (Longmans).—Experimental Mechanics: G. H. Wyatt (Rivingtons).—La Famille Névropathique: C. Féré, deux edition (Paris, Alcan).—Missouri Botanical Garden, 9th Annual Report (St. Louis, Missouri).—Garden-Making: L. H. Bailey (Macmillan).—William Stokes (Masters of Medicine Series): W. Stokes (Unwin).—The Fauna of British India, including Ceylon and Burma. Birds, Vol. iv.: W. T. Blanford (Taylor).

Pamphlets.—Science and Engineering: C. Bright (Constable).—Technical Education. Application of Funds by Local Authorities (Eyre).—Mines and Quarries. General Report and Statistics for 1897. Part 1. District Statistics (Eyre).

Serials.—Strand Magazine, May (Newnes).—Science Progress, April (Scientific Press).—Chambers's Journal, May (Chambers).—Report of the Marlborough College Natural History Society, No. 46 (Marlborough).—Atlantic Monthly, May (Gay).—Quarterly Journal of the Geological Society, May (Longmans).—Observatory, May (Taylor).—Geographical Journal, May (Stanford)—Astrophysical Journal, April (Chicago).—Proceedings of the Royal Physical Society, Session 1896–97 (Edinburgh).—Monthly Weather Review, January (Washington).—Ditto, Annual Summary for 1897 (Washington).—Travaux de la Société Impériale des Naturalistes de St. Pétersbourg. Section de Géologie et de Minéralogie, vol. xxvi. livr. 5.—Ditto, Atlas de Vingt Planches in 4° du Vol. xxv. (St. Pétersbourg).

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